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GUEST EDITORIAL

Sustainability in energy production

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For analyzing the topic of energy production and use, it is convenient to think about industrial activities, heating and refrigeration, and transportation while recognizing the differences between more and less developed areas. The general trend, however, shows a strong positive correlation between development and demand for energy. The requirement of energy for our activities assumes different values in countries of different development and social structure, but it is in any case very important (IEA 2017).

However, on the flip side, and in opposition to the positive feature of satisfying human needs, this productive urge has significant detrimental effects on the environment's quality because of the overuse of natural resources and the release of leftover contaminants into various media. The steady trend of climate change, the alteration of land use and biodiversity, the influence on the quality of the air, water, and soil, and the potential depletion of natural resources, such as fossil fuels or land for energy crops, are all very concerning and must be taken into account (Panepinto et al. 2021).

Numerous supranational authorities and governments have attempted to identify practical tools and prospective strategies useful to limit this negative consequence in light of the observation of the existence and weight of these impacts, as well as by taking into account a very significant concern regarding the negative effects of energy production. To this end, they have defined and required the adoption of interventions and strategies that can be based on operative practices, right choice of energy sources, best utilization of the produced energy, territorial planning strategies, technological containment tools, scenarios definition (AEBIOM 2017; EU 2020).

The issue is undoubtedly of the utmost importance in light of the continuously rising demand for various energy sources, as well as the worldwide repercussions that have already begun and have the potential to significantly alter our natural environment.

The final decision regarding the best workable solution must be expected from the public authorities, taking into account factors that are relevant to various sectors at the conclusion of all analyses about the scenarios and the effects of different options with regard to energy production. The main aspects are the following:

- The availability of various fuel volumes or initial raw materials, their costs, their locations of origin, their costs and any externalities associated with transportation;
- The significance of using renewable energy sources to reduce greenhouse gas (GHG) emissions;
- The ability of various energy sources to meet societal needs and the potential for modulating those sources;
- Consequences of energy system decisions on the quality of local media (air, soil, and water); effects on employment and social issues associated with the energy system choice;
- The moral implications of various energy generation methods (food and non-food original biomass), as well as alternatives that offer different ways to use resources (food, raw materials, soil, and water);
- The price of energy production and the price of impact reduction;
- The dependability of various energy sources, the prospects for the future, the potential for emergencies, and the effects of those emergencies.

In this special issue, some of these points are analyzed. From the viewpoint of the emissions, the following aspects have been analyzed: the impact of regional corruption on carbon emissions based on the spatial Durbin model and the driving factors of individual GHG emissions and the related environmental Kuznets curve in the electricity sector of a developing country. Furthermore, real plant data was used to assess the environmental impacts of waste-to-energy (WtE) operation involving carbon capture and storage (CCS) and quantify uncertainty introduced in life cycle assessment

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(LCA) via energy substitution assumptions. From the viewpoint of the renewable energy, the following aspects have been discussed: an integrated bio-electrochemical system for simultaneous enhanced H_2 and electricity production from waste fermentation, the assessment of solar photovoltaics (PV) and the biodiesel production using electrics arc furnace dust (EAFD) as a catalyst.

Data availability No data are used in my article.

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